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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/577,938

05/03/2006

Timothy J. Phillips

1241158

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23117 7590 03/13/2007
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EXAMINER

GHAZZAWI, MOHAMMAD A

ART UNIT

PAPER NUMBER

2814

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/577,938

Applicant(s)

PHILLIPS ET AL.

Examiner

Mohammad Ghazzawi

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2112

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-14 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5-3-06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Acknowledgment is made of Preliminary Amendment filed May 3, 2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1- 4 are rejected under 102(b) as being anticipated by Feng et al. (Feng)

USPUB 2005/0054172.

Regarding claim 1, Feng discloses (page 5, para 0068) that the base layer of the transistor is highly doped for p-type.

Regarding claim 2, Feng discloses (page 8, para 0127) that asymmetry in well size provides improved directionality and speed of carrier transport.

Regarding claim 3 and 4, Feng discloses (page 7, para 0124) that other configurations and material systems can be used, including, as examples, GaAs and GaN based HBTs, or other direct bandgap material systems.

Claim 1, & 5-8 are rejected under 102(e) as being anticipated by Phillips USPUB 2005/0194613.

Regarding claim 1, Phillips discloses (abstract) a field effect transistor having a primary channel that is preferably a low bandgap material. This means that the transistor includes at least one narrow bandgap region.

Regarding claims 5 & 6, Phillips discloses (abstract) a field effect transistor (FET) having a quantum well. He states that the low bandgap material comprises InSb or InAs.

Regarding claim 7, Phillips discloses (page 2, lines 1-5) that preferably the modulus of the difference between the impact ionization threshold IIT and the effective conduction band offset ΔE_c (effective) between the primary and secondary channels being no more than $0.5 E_g$ (effective).

Regarding claim 8, Phillips discloses (page 4, lines 50-60) a quantum well field transistor wherein the quantum well is provided by a primary conduction channel and at least one secondary conduction channel immediately adjacent and in contact with the primary channel, the secondary channel having an effective bandgap greater than the effective bandgap E_g (effective) of the primary channel, wherein the modulus of the difference between the effective impact ionization threshold IIT (effective) and the effective conduction band offset ΔE_c (effective) between the primary and secondary channels is not more than 0.4 eV.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 10-11 and 13-14 are rejected under 103(a) as being unpatentable over Feng in view of Bakalski US PUB (2006/0261888).

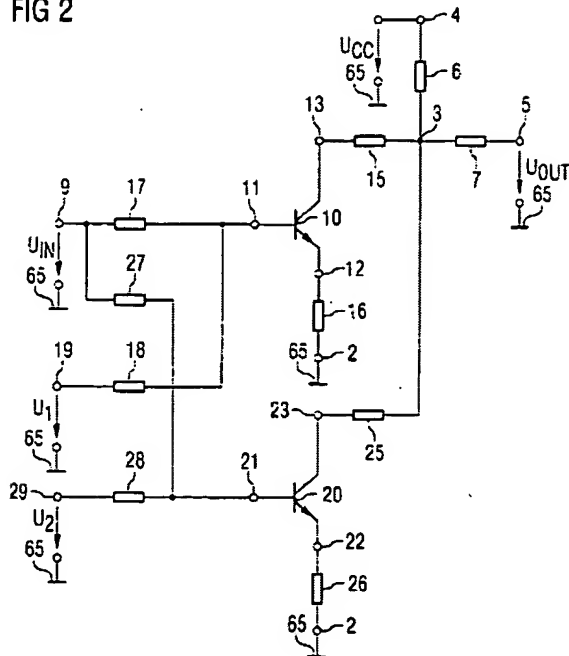
Regarding claim 10, Feng does not explicitly disclose that the bipolar transistor is an npn bipolar transistor.

Bakalski discloses (page 6, para 0094) that the transistors are realized as npn bipolar transistors.

Bakalski is evidence that one of ordinary skill in the art would find a suggestion/motivation to modify Feng by using an npn bipolar transistor.

Therefore, it would have been obvious to modify Feng for advantages (page 6, para 0094) that npn transistors have great driver capability then pnp transistors.

FIG 2



Regarding claims 13-14, Feng does not explicitly show complementary logic circuitry comprising a transistor.

Bakalski shows in Figure 2 complementary logic circuitry comprising a transistor.

Bakalski is evidence that one of ordinary skill in the art would find a suggestion/motivation to modify Feng by using complementary logic circuitry comprising a transistor.

Therefore, it would have been obvious to modify Feng for advantages of having an amplifier arrangement implementing the use of npn transistors.

Regarding claim 11, Feng discloses (page 3, para 0045) a transistor with a base region, a collector, an emitter, and a base contact. Feng discloses the claimed invention except for the narrow bandgap being greater than 0.5 eV. It would have been

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obvious to one of ordinary skill in the art at the time of the invention was made to modify Feng, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Claim 12 is rejected under 103(a) as being unpatentable over Phillips.

Phillips discloses the claimed invention except for the narrow bandgap being no more than 1.0 eV. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Phillips, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Allowable Subject Matter

Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance:

The prior arts of record do not anticipate or render obvious to one of ordinary skill in the art one junction which is bias able to reduce the intrinsic conduction in the quantum well and confine charge carriers predominantly to one type only corresponding to an extrinsic saturated regime.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad Ghazzawi whose telephone number is (571) 272-9756. The examiner can normally be reached on m-f every other friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur Chowdhury can be reached on (571) 272-9819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mohammad Ghazzawi
Examiner
Art Unit 2809

MAG
3-5-07


KIMBERLY D. NGUYEN
PRIMARY EXAMINER